

Utility Arborist Newslines

JUL/AUG 2019

VOLUME 10

NUMBER 4

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Managing Thriving Ecosystems Task Force Designs a Maturity Model for UVM

By Jason Grossman, Manager of T&D, Liberty Utilities; Maria Westerhold, ISA-Certified Senior Program Manager of VM, ComEd; and Stan Vera-Art, ISA-Certified Creative Catalyst, Grow with Trees Company

This UAA *Newslines* edition is dedicated to fundamental program management. Through fundamental project management, we can peek into the world of project management and then pull back to view the panorama that is our industry.

Project management has been around for a long time. In fact, many scholars cite it as a requisite for constructing the great pyramids, but it wasn't until about 50 years ago that the profession was recognized as modern—that was when the Project Management Institute (PMI) was founded. Soon afterwards, the PMI published the Project Management Body of Knowledge (PMBOK), a set of standard terminology and guidelines for project managers. Project managers who obtain enough PMBOK can take an exam and become Project Management Professionals (PMP) with credentials supplied by the PMI. More recently, PMI credentials have been expanded to include Portfolio Management Professional and a half a dozen other related certifications. Additionally, PMI promoted a Project Management Office (PMO) Maturity Model. Their Maturity Model is used to measure a PMO's

FOCUS ON FUNDAMENTAL PROGRAM MANAGEMENT

maturity and serves as a roadmap for how to best incorporate PM practices into a corporation's organizational structure. So, when it comes to managing programs (a collection of similar projects), a great deal of research, literature, and professional development has been advanced in the past 50 years.

For several years, the PM profession was the fastest growing profession in the world. Today, the PMI has organizational chapters located in every country. Hundreds of thousands of people possess PMP credentials and many have dedicated entire careers to PM. PMBOK tools and techniques can be found in nearly every industry, including our own.

When we compare the PM profession with the utility industry, many similarities appear. Although it is unlikely that utility vegetation management (UVM) will ever be among the fastest growing professions in the world, we are, just like PMs, witnessing the development of an increasingly more complex profession, especially when it comes to managing for thriving habitats on rights-of-ways (ROWS). Many

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UAA Task Force - Maturity Model *(Continued from page 1)*

industry members continue to advance our own industry-specific PMBOK, which we call ANSI standards, complemented by a variety of best management practice (BMP) guides, available for establishing VM program standards practices and enhancing knowledge. Like PMPs, utility vegetation managers also have a variety of industry-specific credentials, like Certified Tree Worker, Climber Specialist, and Certified Arborist Utility Specialist. Just as PMP credentials have advanced through time, so too will UVM certifications. It's likely that in the future, we will add certifications like Certified ROW Habitat Specialist or Certified ROW Ecosystem Specialist to our already long list of certification options, but when it comes to an industry-specific Maturity Model, utility vegetation managers have few benchmarking tools to advance management systems.

In general, Maturity Models are tools that benchmark a program's level of maturity. Models are typically divided into four to seven levels to help managers evaluate their current activities and effectiveness and plan additional activities to advance program maturity. Benchmarking one's current maturity is an important process that provides an opportunity for self-reflection, prioritizing learning, and knowledge development. Maturity Models structure the direction that industries like ours will take and the actions required by individuals to keep in step with changing paradigms. As our industry advances into changing environmental and social climates, self-reflection and planning will become increasingly important to keep pace with change.

The UAA Task Force, *Managing for Thriving Ecosystems*, recently introduced a utility-specific Maturity Model. During

initial development, we quickly learned that, like any model, our own Maturity Model would be a simplification, erring in some applications despite best intentions. Despite unavoidable shortcomings that may arise through generalization, a basic Maturity Model model can still provide useful benchmarking and guidance for VM departments. Based on the principles of the PMI, the UAA Task Force began creating our own utility-specific Maturity Model, the VM Maturity Model (VM3). The VM3, designed for utility vegetation managers, is still in development and has undergone periodic testing with utilities to enhance and hone maturity levels and activities. Here we share our current design and would like to encourage industry feedback, comments, and contributions; but first, here is a brief introduction to the VM3. The VM3 is divided into four levels. Each level lists and quantifies activities. Activities are grouped into four categories:

1. Common Language
2. Record Keeping
3. Stakeholder Engagement
4. Sustainability Reporting

Grouping activities into categories makes it easier to focus on a similar group of activities at once. The more categories and activities in which a utility engages, the higher their level of maturity. Level 1, *Compliance*, lists the common activities a VM department must engage in to meet compliance rules and regulations. Level 2, *Industry Standards*, addresses adoption of standards such as the ANSI A300 Section 7, integrated vegetation management (IVM) BMPs, and industry certifications. The focus of levels 1 and 2 is compliance (e.g., FERC) and standards. See figure 1. *(Continued on page 4.)*

Figure 1: The Vegetation Management Maturity Model (VM3) Overview
Compliance-Based VM



Level 3, *Beyond Compliance*, provides a road map for how to begin incorporating ROW habitat metrics. And Level 4, *Corporate Sustainability*, lists activities to align VM sustainability efforts with corporate sustainability efforts. Levels 3 and 4 focus on creating and reporting on compatible ROW habitat. See figure 2 below.

The VM3 is supplemented by a short introduction, and a list of acronyms and definitions. Working through the VM3 usually takes anywhere from one to two hours. It is important to accurately evaluate activities and levels of engagement. An honest evaluation provides a base line for planning activities that will enhance a utility’s level of engagement and maturity. Inaccurate answers will not provide reasonable benchmarking.

As a planning tool, the VM3 facilitates evaluation of current activities and level of engagement, which provides a roadmap for development. Evaluating and prioritizing next steps helps managers plan for associated costs of development. Roadmaps and development costs that emerge from the VM3 are strong tools for presenting actions and budgets to management.

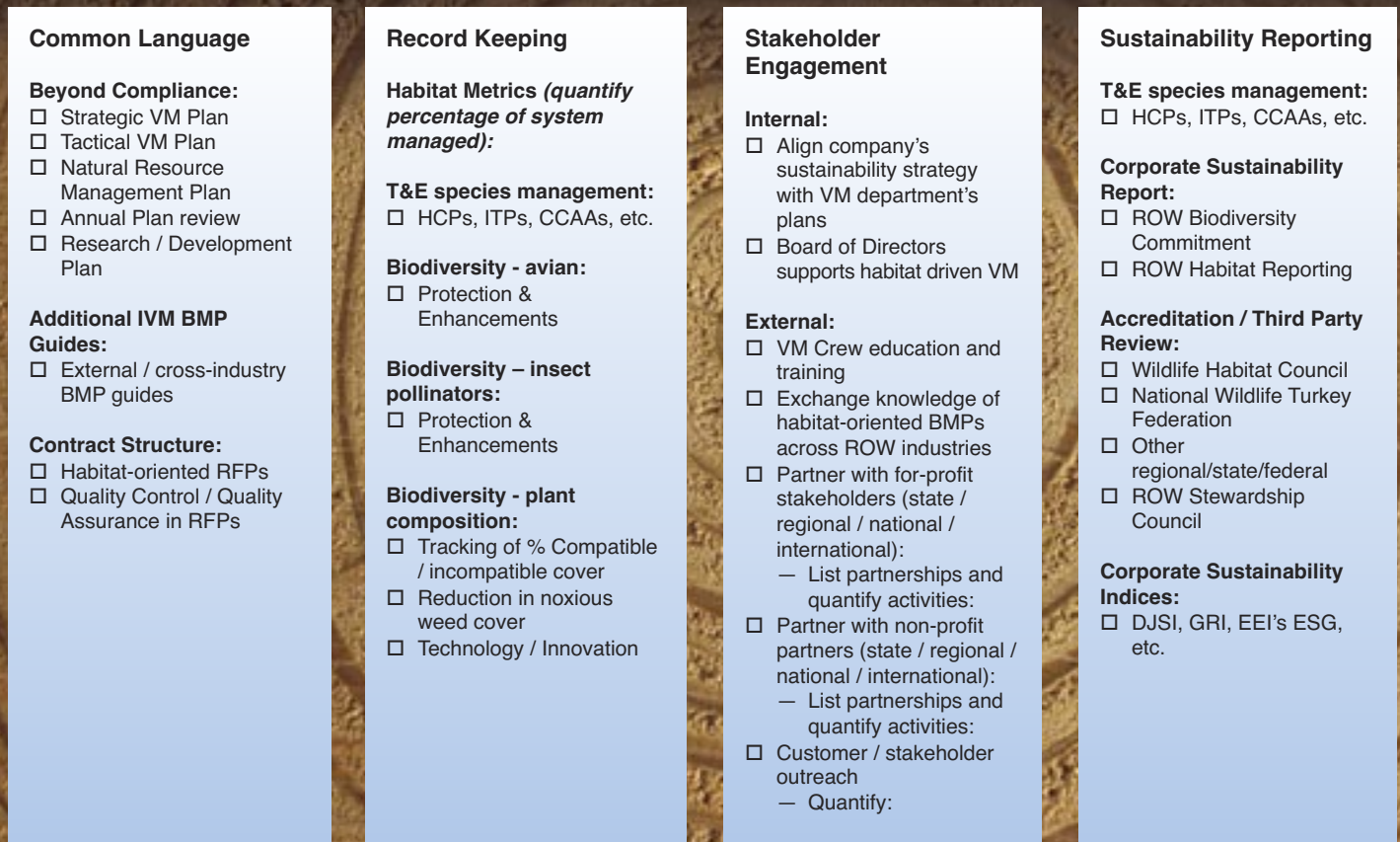
ComEd, an Exelon Company based in northern Illinois,

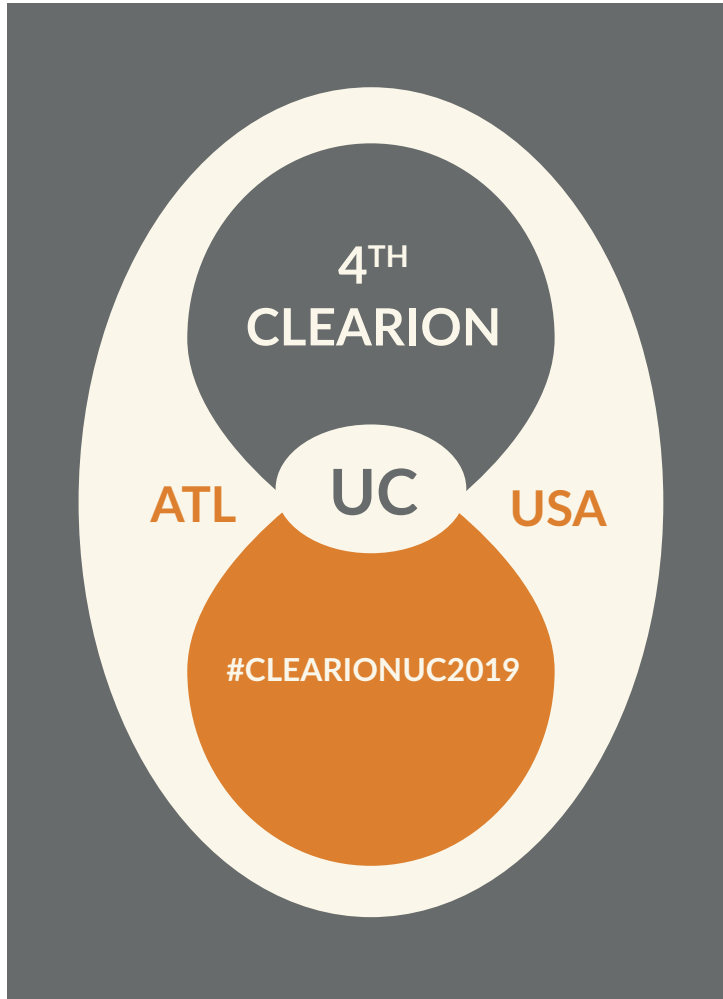
helped to test an initial draft of the VM3. During the exercise to evaluate the model, it became clear that ComEd was involved in activities listed by the VM3, but that were not tied directly to their long-term VM plan. Additionally, the company found that the discussion helped to clarify the nuances and extent of their activities and practices. Furthermore, talking through the model provided an opportunity to think about what supplementary steps could be taken to advance the VM program to the next level, and to think about how to measure and monitor these steps and actions.

Liberty Utilities Central also helped to test the VM3. Model results indicated that Liberty Utilities Central has a strong program with a few areas for improvement. The evaluation provided a useful baseline and guidance from industry professionals to enhance Liberty’s program. The goals of VM programs are improved reliability and reduced costs through sustainable practices. The VM3 provided a foundation for moving Liberty toward these goals.

The VM3 is available for download from the environmental section of the UAA website. The task force welcomes your contributions and we look forward to continued refinement of the VM3 in years to come.

Figure 2: The Vegetation Management Maturity Model (VM3) Overview
Habitat-Based VM





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President's Message

By Bob Richens

Greetings UAA members! I am looking forward to the Trees & Utilities Conference in September.

Who has attended the UAA Region meetings and/or Safety Summits this year? Who knows they need to stop what they are doing and make plans now to attend one of the upcoming UAA-sponsored conferences? You know who you are!

We can all get so busy we often miss the opportunity to attend these events. There is value in networking with your peers, learning new information, realizing that others have faced the same challenges your utility has, and have found solutions to problems. Don't miss out. You owe it to yourself and won't be disappointed.

Another great resource: do you have a copy of *Utility Arboriculture: The Utility Specialist Certification Study Guide*? Published in 2018, this new reference guide provides a wide range of information about utility vegetation management (UVM). Critical elements are covered in 267 pages divided into seven chapters, including Safety; Program and Personnel Management; Utility Pruning; Integrated Vegetation Management (IVM); Electrical Knowledge; Storm Preparation and Response; and Communications. Plus, the book includes a list of 275 references, an index, and a glossary. More than a study guide, this book provides a comprehensive overview of our industry and belongs on the bookshelf of anyone involved with UVM, regardless of whether they are a utility arborist. It is available from the International Society of Arboriculture (ISA).

If you haven't visited the UAA website in a while, be sure to check out the new Environmental Stewardship information. Pollinators, a critical link in our own food supply, are in serious decline. Utility rights-of-way (ROWs) can replace lost pollinator habitat, but creating sustainable habitat and functional utility corridors requires the use of standards, BMPs, and project management (PM) skills. A PM "Maturity Model" is available on the UAA website and can serve as a roadmap for utilities with an interest in improving habitat, or pursuing ROW Stewardship Accreditation.

Though early bird pre-registration for the September conference has passed, you can still save some money before August 19th.

And, just as a reminder, we're always looking for your input and should you wish to write an article for the *Newsline*, please let us know. Contributions from you make this an informative and relevant publication of the UAA.

See you at the conference!



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Executive Director Comments

By Phil Charlton

The 2019 System Utility Vegetation Managers Summit just wrapped up. It was held in Charlotte in early May and more than 40 attended. This year, they decided to tackle what has become one of the greatest challenges to the utility vegetation management (UVM) industry—worker recruitment and retention and, more specifically, how utilities impact these.

Sara Sankowich (Unitil), Emily Kramer (ComEd), and Jay Griles (Dominion) presented on the results of the UAA’s survey of VM contractors and shared insights from their experiences. Not too surprising, the survey showed pay is at the top of the list, but it’s not the only concern of utility arborists and IVM workers. Other factors are important, such as travel, training, the utility culture, respect for skills, and relationships with fellow workers and supervisors.

Annie Fletcher of Duke conducted personal interviews of more than 100 tree crew workers

to gain insight in how they think about their jobs and what drives their decisions to stay or go from their current employer. Fletcher showed us how different generations have different priorities and perspectives. If we are going to address recruitment and retention, we cannot just observe the differences, but we must understand and respond to them.

There seemed to also be a consensus among the contractors surveyed and the utilities attending the summit. Building relationships with trade schools and introducing potential workers to UVM careers at an earlier stage, like high school, would benefit the industry. Brad Dailey gave a great talk on how New Brunswick Power developed a training program for future tree workers in their area.

This edition of the *Newsline* focuses on program management. Effective program management is dependent on having a well-trained, stable workforce. If you want to learn more about the findings of the summit, I would encourage you to consider attending the upcoming Trees & Utilities Conference this fall. If you want to help the UAA and what role it should play, I encourage you to join the new taskforce that has formed. If not the task force, consider one of the other committees. It is amazing what these teams are getting done for the industry with many hands and a little time.



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Safety

T A I L G A T E

Job Hazard Analysis for the Non-Tree Worker VM Employee *By Bob Urban, Senior Manager, ACRT, Inc.*

Field operations for utility vegetation management (UVM) is an environment full of potential job hazards. What are some risks involved that come to mind? Electrical exposure, struck-by potential, and—likely the most dangerous action in the industry—driving. Tremendous attention is geared towards the field operations that pose the greatest risk and potential exposures: tree workers, equipment operators, and spray technicians. However, there are other field operations groups that are in the right-of-way (ROW) every day and they work alone nearly 90 percent of the time: the utility pre-inspector, quality control auditor, and the safety inspector, to name a few.

What is a job hazard analysis?

OSHA defines a Job Hazard Analysis (JHA) as “a technique that focuses on job tasks as a way to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. Ideally, after you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level” (OSHA 3071, 2002, Revised). For the utility vegetation inspector, the uncontrolled hazards are as varied on a day-to-day basis as the number of languages spoken at the United Nations. These workers find themselves in sit-

uations that require them to take a personal responsibility in identifying and mitigating the uncontrolled hazards. While employers are responsible for providing employees with the proper processes, trainings, tools, and resources to reduce risk levels, the countless uncontrolled hazards create a challenge for all to keep this group injury-free.

Documenting Safety Trainings

Books, articles, trainings, and consultants can tell you 1,001 ways to make your safety program better or show you how to create a solid documentation trail. The key to

a good safety program is not only the documentation, but getting employees to focus for a few minutes on the JHA before they start their task. This can help identify and minimize any present risks.

We can spend huge budgets on day-to-day exposures. For example, ticks can be costly. We educate employees on tick identification and prevention by conducting tick safety tailboards, we provide employees with the necessary personal protective equipment (PPE), and employees are given instructions should they find themselves exposed to a tick. When the season and environment are good for tick populations, how do we know our employees are utilizing all the training and PPE as they were instructed? We don't.

Most operations carry some sort of electronic platform to collect information in the field and almost every individual carries a smartphone. We need to use the tools we already carry to do the work for us in this situation. Monthly, weekly, or daily safety tailboards can be performed on these platforms, as well as a site-specific JHA. Supervisors can check that trainings were completed, and the completed safety training records are documented.

Utilizing the Pocket Card Approach

The dynamic nature of work sites for utility consultants pose many challenges. Sites are so diverse and the tasks so varied that an individual may need to create a JHA on the spot before they proceed with their task. A hard copy card can be produced that employees can carry and use throughout the day. Understanding how to use this card and documenting when it is used safeguards employees and keeps employers in compliance.

Example of verbiage for JHA card

WHAT IS YOUR TASK?

- How far must you travel? Hike?
- Do you have the proper PPE? Are your clothes treated with insect repellent?
- What hazards are associated? Are there any environmental concerns?
- Is someone with you or does someone know where you are going?
- Are there other work groups close?
- Are you required to carry an Epi-Pen? Do you have it on your person?

DO YOU KNOW...

- The line name and/or index number and structure number?
- The closest address and the closest hospital?
- If there is cell service?
- If there are hostile situations or customers expected?
- If you are parked in a safe location (out of the wire zone, dry area, etc.)?

Helping Birds Balance the Risks of Migration

By Doug Tallamy, Professor and Chair of the Department of Entomology and Wildlife Ecology at the University of Delaware.

SPOTLIGHT on the Environment



NASA IMAGE



Baltimore Oriole

PEGGY DYAR — PIXABAY

There are 650 species of birds that breed in North America. More than half—some 350 species, in fact—are long distance migrants—birds that have tropical origins, but fly thousands of miles north to reproduce. It may seem puzzling that they should make such an effort; the physiological strain of migration is difficult to comprehend. Migrants lose as much as 35 percent of their body weight if their migration route takes them over the Atlantic Ocean or across the Gulf of Mexico, and many die of exhaustion before they make landfall. Once in North America, they can fly 300 miles in a single night if they have a tail wind, but when they stop for the day to rest, they must also refuel.

In the spring, the energy that fuels migrations comes primarily from insects rich in fats and proteins. A migrant will increase its body weight 30-50 percent each day they spend in stop-over sites by eating insects, if there are enough insects to eat. If the migrant birds find enough food, there are still challenges, from uncooperative weather conditions—particularly from storms and stalled fronts in the spring—to hurricanes in the fall. In short, migration is the most dangerous and taxing endeavor a bird will attempt in its lifetime. Yet, as with any other life history trait, the ecological benefits of migrating north during the spring to breed, and then back south to the tropics for the fall and winter, must have outweighed the costs; otherwise, the behavior would not have evolved in any bird species, let alone

in hundreds of them. And indeed, when migration evolved, the benefits *did* out-weigh the costs—birds that flew north to rear young could raise more offspring than birds that did not.

Since the most recent glaciers retreated and during every interglacial period before that, the temperate zone offered something to birds that the tropics did not: a nearly inexhaustible supply of insects. Each spring across North America, there is an explosion of fresh, tender foliage that is followed closely by an explosion of the insects that eat that foliage—a resource bonanza for birds that reared their young on insects. Birds that migrated north to take advantage of this enormous pulse of food could raise four to six young each year, which is a much better reproductive output than the two to three offspring which their tropical relatives could muster, and apparently worth the dangers and stress of the migration required to do so.

The evolution of bird migration was triggered and sustained for millennia by the seasonal flush of insects in the temperate zone. Migration could continue to be a viable strategy today as long as migrants are able to balance mortality from risky migration with enhanced reproduction once they arrive in breeding grounds. The migration process still requires diverse and abundant insects everywhere. Birds need to breed to be successful as a species. Therein lies the problem: wherever we have reduced the absolute number of plants in an area,



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or replaced the native plants that support insects with nonnative plants that do not, insect populations (and thus the migrants and their ability to balance their risk equation) have been devastated.

Devastated is a strong word; however, my students and I, for more than 15 years, have been measuring the impact of invasive and ornamental nonnative plants on insects and the birds that need them; we have the numbers to support this statement. One of our recent studies impressively illustrates the magnitude of the impact nonnative plants have on caterpillars. We measured what happens to caterpillars when nonnative plants displace native plants in agricultural hedgerows. By every measure, the caterpillar community was seriously diminished when introduced plants replaced native plants. Even though there was more plant biomass within the invaded hedgerows, there were 68 percent fewer caterpillar species, 91 percent fewer caterpillars, and 96 percent less caterpillar biomass than what we recorded in native hedgerows. With these numbers—in terms of the everyday needs of the animals that eat caterpillars—we found 96 percent less food available in the invaded habitats!

What do such reductions mean for the animals that eat caterpillars? Until recently, we could only guess. Desiree Narango (Ph.D Candidate, Smithsonian Migratory Bird Center) for the first time has measured the impact of nonnative plants on bird reproduction. Using Carolina chickadees as model birds, and our nation's capital as a stereotypical human-dominated habitat, Narango found that nonnative ornamental plants supported 75 percent less caterpillar biomass than native ornamentals. How did this loss of bird food impact chickadees? It clobbered them. When yards contained more than 30 percent nonnative plants, chickadees were 60 percent less likely to breed at all, and if they did try, they were unable to produce enough young to sustain their population. The good news from her study was that we now have a target to shoot for when designing our landscapes. We can support breeding bird populations indefinitely as long as at least 70 percent of the plants in our yards are native.

Can rights-of-way (ROW) help birds balance the risks of migration and breed successfully? Absolutely, but only if they are managed in ways that build and sustain insect populations. There are thousands and thousands of ROWs in the U.S., and most of them offer the opportunity to maintain or restore one of our rarest habitats: scrubland. Energy companies that promote keystone native plants (i.e., those that produce the bulk of the insects that birds require, and reduce the load of invasive plants that destroy insect populations) could meet the nutritional needs of millions of migrating and breeding birds. In fact, with control of so much land, energy companies could lead the way to reversing the decline of insects and all the animals that depend on them.

Carolina Chickadee



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UAA Events Committee Update

By Brandon Hughson, ISA-Certified Arborist, Rainbow Tree Company; and Michael Sultan, Project Developer, Davey Resource Group

Since our last update, the Events Committee has been busy bringing you quality training and programs through regional UAA meetings and national partner conferences. You might have noticed an increase in topics addressing environmental awareness and stewardship. This is, in part, due to general industry trends, and it aligns with a new core value of the UAA: *environmental sustainability*.

Following the adoption of new strategic objectives for the organization, the Events Committee’s strategic plan now includes:

- Making safety a core value of every initiative
- Making environmental stewardship a core value of every initiative
- Offering six or more regional training opportunities
- Developing excellent programs for national meetings

Regional Representation

The Events Committee strives to provide educational and training opportunities to members across North America. Last year, we mapped our U.S. membership by state, simply to get a better understanding of our member distribution. This has been a useful tool to begin identifying geographical gaps in where we are offering opportunities for learning.

We are considering other opportunities to better serve our members; one of which is the possibility of a Texas regional meeting in 2020. Please keep an eye out for more information on this and other possible new events. If you have suggestions on how the committee can better serve members regionally, please let us know.

12 Months in Review

Within the past 12 months, the Events Committee has worked with UAA Members and partners to provide the following:

October 2018

- Ohio Regional Meeting
- New York Regional Meeting
- Western Regional Field Day and Meeting

February 2019

- Michigan Regional Meeting

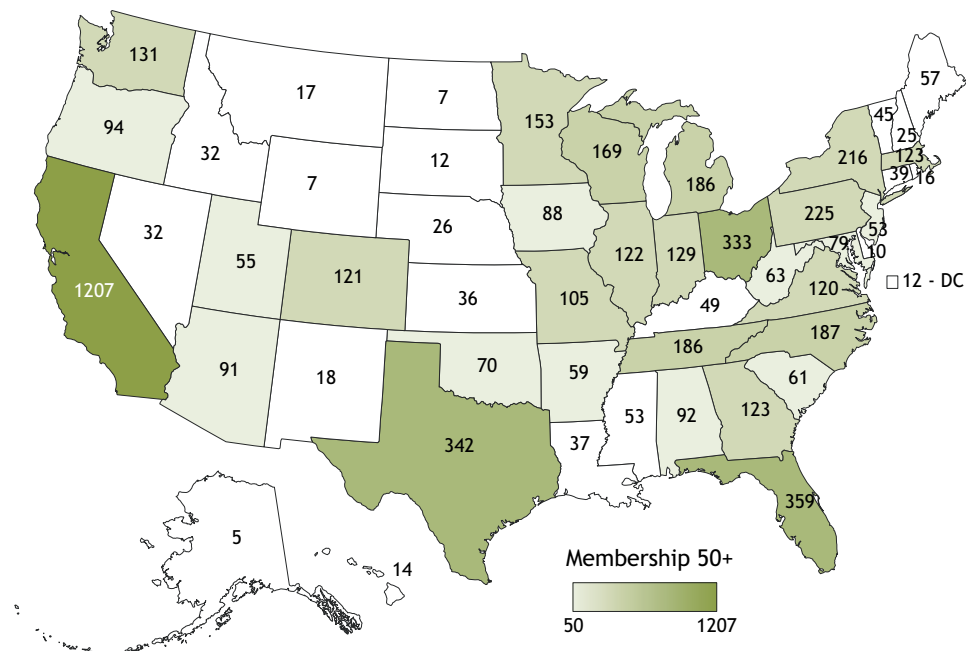
April 2019

- Southern Chapter ISA Conference with Complete Utility Track

Attracting New Members and Partners

In addition to the UAA embracing environmental sustainability as a core value, another addition to the organization’s strategic plan is to engage with other energy delivery organizations and ROW managers outside of electric utilities. A few of the more notable examples are gas utilities and pipeline operating companies, as well as the railroad industry. If you know other professionals facing challenges and seeking solutions for

United States Distribution of UAA Membership



What to Look For

There are several UAA and partner events coming up soon, so be sure to keep an eye out for e-mails with information about programs and registration.

August 2019

- International Society of Arboriculture Annual Conference - Knoxville, TN | Aug 13-15

September 2019

- Trees and Utilities Conference - Cincinnati, OH | Sep 10-12

October 2019

- Ohio Regional Meeting – *location TBD* | Oct 4
- New York Regional Meeting – *location TBD* | Oct 9-10
- Western Regional Field Day and Meeting – *location TBD* | October 23-24

better management of ROWs and utility assets, please encourage them to visit the UAA website and let us know who they are.

Support for UAA Events

Support for UAA events comes in many forms—financial sponsors/exhibitors, volunteers, presenters, etc. Our events would not be possible without this assistance. Engaging sponsors and exhibitors are a key function of this committee and allows the UAA to deliver high quality training and programs to our members at a reasonable price. We appreciate our current and previous partners and look forward to welcoming new UAA partners.

Giving Back

Are you planning to attend any of the UAA regional meetings, safety summits, or national events this year? If so, we can always use help staffing the UAA booth, and there is a lot going on behind the scenes at each event where a few extra hands are always appreciated. If you plan to attend an event and are interested on how you can help, please contact Diona Neeser: dneeser@gotouaa.org.

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The need for utility research continues to grow and evolve. The Utility Arborist Research Fund (UARF) was established in 2010 to finance work of real importance and benefit to utility tree care professionals. Thanks to individual donors like you and partner companies, the fund is officially live, providing \$50,000 per year in perpetuity for new utility research projects. The first UARF grant was announced in June 2018.

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Tree Maintenance: Building a Foundation of Expertise

By Bill Nantt, Tree Program Coordinator, Caltrans

The great state of California is known for a lot of things, not least of which is its breathtaking and diverse landscape. California's scenic geography is filled with beauty that ranges from long stretches of desert terrain and glorious mountain ranges, to tall, air-filtering timbers in the north, palm trees of the south, and the wave-crashing Pacific Ocean on the west. There is as much variety as a traveler can find within the U.S. Keeping those roadways safe in between each destination offers the California Department of Transportation's (Caltrans) statewide tree program plenty to account for as it adheres to its commitment to provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability.

Caltrans' tree program is comparatively small in relation to the vastness of the department's overall operations, but is no less critical when it comes to protecting citizens and the forests along the state's highways. Removing dead and other hazardous trees that could impact the safety of California's roadways is a priority of utmost importance, as is the safety of Caltrans' employees who perform the tasks associated with tree maintenance.

Tree work is a dangerous job, and it's one that must be executed with a strong focus on safety and best practices to truly be effective. That's why Caltrans recently made the investment in a new arborist training program to offer all tree workers throughout Caltrans a course on best safety practices for tree care operations, proper techniques, and other tree work fundamentals. It was the first initiative of its kind at Caltrans and was based on a curriculum that was custom developed in conjunction with ACRT, a third-party utility vegetation management (UVM) consulting and arborist training company that also assisted Caltrans with putting on each training session.

Needs and Benefits

The initial idea to implement an arborist training program originated from a risk-management perspective. For years,



Many lessons were learned, such as the importance of inspecting equipment. Some beneficial takeaways from the new program were able to immediately become standard practice throughout Caltrans' work.

Caltrans has offered its tree program's workers a number of classroom training modules, but decided that wasn't enough in this day and age. Especially with California experiencing the severity of record-breaking drought, torrential rain, flooding, and fires. Caltrans recognized the value in having an objective third party, such as ACRT, help in identifying how, and where, delivering such a program would benefit the department the most.

The department knew at the outset that, to be effective, an in-depth training program would need to be organized in just the right way for them to achieve a successful outcome. Prior to enacting any parts of the new arborist training program, department heads put their minds together and thought through what might be needed: in what areas are crews currently struggling? Where could they stand to enhance skill sets? What knowledge do employees already possess, what do they not know, and what should they know?

Caltrans held meetings with internal leadership, solicited feedback from its tree crew supervisors (approximately 20



Supervisor staff members went through a “train the trainer” style aerial rescue. All crews received both classroom and hands-on field training.

throughout the state), and met with representatives from ACRT to further identify their needs. As a way to broaden customization of tree worker courses, training classes were first conducted at the supervisory level, which was a great way for the department to understand the day-to-day of each Caltrans district. It also allowed supervisors to have influence in the training’s competencies.

One significant aspect of Caltrans’ new arborist training program was accounting for the different geographical locations of the service areas covered by the tree crews. There was a need to formulate an all-encompassing training program to meet the crews’ individual territorial needs. Through discussions with each territory supervisor, Caltrans was able to identify specific training topics that met the needs for crews working in different geographical districts. Tree maintenance crews in the northern part of the state, which deal with tall Douglas Firs (*Pseudotsuga menziesii*), perform different work and have different needs than those dealing with Eucalyptus trees (*Eucalyptus globulus*) along the central section of California’s heavily trafficked roadways. The riskiest areas for Caltrans’ crews are along the coastal highways, where winding roads, steep cliffs, changes in elevation, and other landscape-related challenges are commonly faced by workers. It was those perilous areas that received special attention as Caltrans developed the arborist training program.

The department’s new training program also took into consideration things such as the nuances required in

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As a prime example, a Job Done Right means not only listening to our customers tell us that safety is one of the most critical factors in their vegetation management (VM) operations, but also recognizing that doing more of the same is unacceptable. Although our safety record has gained strength with time, we have a strategic imperative to raise the bar further and move with care and urgency to a new view of safety and human performance.

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A Caltrans supervisor ascends a tree, demonstrating an aerial rescue on a dummy.

Lessons Learned

With the initial training complete, many lessons were learned and some beneficial takeaways from the new program were able to immediately become standard practice throughout Caltrans' work. For instance, aerial lift pre-flight inspections are now par for the course on all tree projects. However, throughout the undertaking of the new program, it became clear that Caltrans' crews were in

need of familiarizing employees with electrical hazards and line clearance certification. The electrical component of tree work might not be the first thing a person would think of when it comes to keeping roadways free from hazardous vegetation; however, it is a factor worthy of great concern, considering that all roads throughout the state are decorated with streetlights and are filled with electrical lines, which are issues tree crews are constantly having to work around. Identifying hazards throughout the program's training sessions, Caltrans discovered topics and areas where additional investments would be most beneficial in the future. The department is currently in discussion on building a formal line clearance certification program for its employees and hopes to institute it in the near future.

Caltrans' tree program is comparatively small in relation to the vastness of the department's overall operations, but it is no less critical when it comes to protecting citizens and the forests along the state's highways.

trimming ornamental vegetation in Southern California, as opposed to dealing with large timber and pruning in the Sierras and northern coastlines. Since the fundamentals of tree care and safe working practices do not change as much as the need for how crews go about that kind of work, Caltrans included work set-up and job briefing (based on different geographies), along with commute and traffic volume, into its program.

Intangible benefits were produced by the training for Caltrans' teams across the state. They received nothing but positive feedback from each worker who completed the training courses, and many felt that going through the process helped put them back in touch with the work they do each day.

Training in Action

Once the curriculum was established in 2017, training across the state commenced. ACRT helped Caltrans identify the right training for employees based on each tree worker's level of experience. Once those prerequisites were distinguished, the department was able to reintroduce some of the fundamentals of tree care and safety principles to all its crews. Training encompassing a higher degree of advanced rigging techniques and practical tree care applications was given to crew lead workers. Supervisor staff members went through a "train the trainer" style of aerial rescue. All crews received both classroom and hands-on field training.



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“Teams feel more confident performing their work when they have the knowledge of established, industry-standard best practices,” said Tony Tavares, division chief, Caltrans Division of Maintenance. “They were happy to receive this kind of organizational attention; it’s proof positive that Caltrans, as an entity, recognizes the importance of the work this specialized team does.”



Training and exposure to rigging equipment, such as this Port A Wrap and Rigging Block, was given to the crew leaders. These tools can manage the friction in a rigging scenario more consistently and can lengthen the life of a rigging line.



A Solid Future

What Caltrans may have lacked in the past, and what this training program initiative delivered, was uniformity. Each tree worker had his or her own level of expertise, perhaps learned at different points of time or areas in their careers. However, by offering employees the newly instituted arborist training, it helped solidify a firm foundation built upon the fundamental elements of communication, safety, commitment, and performance. It creates an organization of workers who have been allowed to speak the same language around safety, best practices, and tree work techniques, and it creates a department that now has a baseline from which to grow as it continues to invest in the safety and expertise of its workforce.

Caltrans has now laid the foundation for continuous improvement, and its unremitting investment will manifest in the work it does each day—helping to better protect California’s magnificent forests, roadways, and citizens.

Bill Nantt is the coordinator for Caltrans’ tree program and integrated VM (IVM) program. He is a licensed pest control advisor and certified arborist. He has been involved with VM for more than 35 years.

Project Planning Made Simple

By Justin Walters, Lead Geospatial Analyst,
Davey Resource Group, Inc.

A streamlined system that has the capability to record, access, and evaluate data for vegetation management (VM) with ease is invaluable to complete work plans in a timely manner. Rover, a Windows and GIS-based software for the field collection of data, presents a complete solution, which can be customized for a utility program's needs to help them plan and manage work. This innovative new system keeps everything organized, and with GPS accuracy, a simple interface, and built-in permission and notification forms, it solves a variety of issues with efficiency and ease.

One of the major challenges addressed by Rover is the capability to share and transfer the collected data from dispersed areas into a centralized database. Having the data in a singular location allows for consistency in quality and the progress tracking of various locations at once. This database can be used as a data hub and is compatible with third party applications, or it can be used as the sole software solution of an integrated vegetation management (IVM) program. The raw data can also be easily placed into spreadsheets or enterprise systems for reports, analysis, and overviews.

PHI, an Exelon Company, has been using the software successfully for the past four years. The software provides an all-in-one solution to managing their projects; it aids in the creation of work plans by allowing the implementation of a unit-based approach to their VM. Since Rover can collect points and lines, these units can be assigned work that needs done on them, from herbicide application to brush management, which provides them with the knowledge of how much each project will cost, allowing them to



stay on budget for VM since they can make necessary adjustments before the work is assigned.

Another more specific benefit they have been able to obtain from this system is a set-up between a contractor and their Rover data, which allows them to upload the data directly onto timesheets. Then, the contractor only needs to pick which units have been completed and receives payment based on the work completed.

“It creates transparency and speeds up the process,” said Dan Landry, supervisor, Forestry Operations PHI Distribution. Rover also allows for parcel-level information from tax map records, which are uploaded into the software. Landry reports that this “expedites data entry and eliminates typos,” which streamlines their operations. They have a feature in which software data can be viewed on their iPads, which is extremely helpful. It can download the data for use in the field to audit work and generate reports.

Rover brings convenience and efficiency to interactions with customers and contractors. The software also has the capability to generate forms for customers on their





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properties who have opted to give PHI their e-mail address. They can digitally sign the automatically generated permission and notification forms rather than having to use paper slips with carbon copies as receipts to the customers. The customer will automatically receive confirmation via their e-mail of the form that they signed for the work scheduled on their property for their review.

A new feature, the ability to upload and assign photos to features on the map, helps with communication between PHI and their contractors. This allows employees in the field to directly notate on top of photos, indicating clearly the work that needs to be performed, which heightens their ability to convey necessary information. The system can support many pictures tied to one feature, and they, along with other scanned images, can be linked to any collected data, which can be easily labeled with attributes and printed.

One aspect that PHI has found particularly useful are the reports generated from the inputted data. Having used the software for years, according to Landry, they can see “cycle over cycle what work they have been completing in their different areas for a wide-lens view of their history to better predict what is necessary going forward.” They use this data for designing new circuits and targeting those that are due for upgrades. There is also a Work Summary Report, which is a simple dashboard that compiles and summarizes the data for what is yet to be completed within the system. This information is displayed by individual circuit line.

Rover is the product of more than 18 years of collaboration with utility companies. Davey Resource Group, Inc. has an in-house Technology Team, which improves the software and works with clients to maintain their use of it within their VM programs. PHI has experienced the upsides that Rover can bring to their operations. Their input, along with other clients’, is helping to improve the software, which hopes to become the premier software for utility VM (UVM) use.



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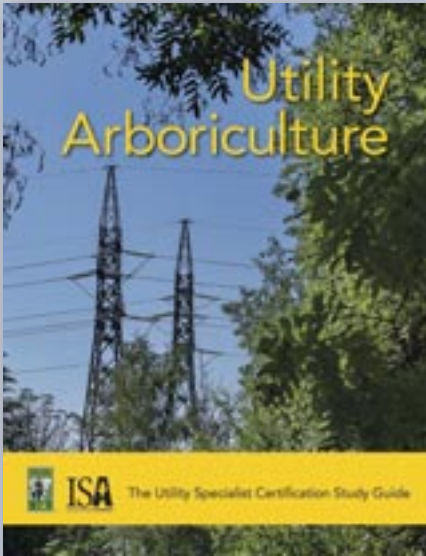


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BRONZE AWARD

Project Management

By Randy Miller, Director of Research Development and Industry Intelligence, CNUC



This article is excerpted from the "Personnel and Program Management" chapter of the new Utility Arborist Certification study guide (Miller & Kempter, 2018). Note that the concepts summarized here merely scratch the surface of an entire professional specialty. Interested readers are encouraged to consult the references cited as well as the many other volumes dedicated to the subject.

Many utilities spend more money on vegetation management (VM) than any other single operations maintenance line item. Utility vegetation management (UVM) departments, and the contractors who partner with them, have an obligation to be as efficient as possible. Principles of program management (PM) are helpful tools toward that end. The purpose of well-planned and executed PM is to provide a consistent, systematic approach to meeting program objectives.

An important concept of PM is the triple constraint triangle. Projects are subjected to three constraints: time, cost, and scope (Figure 1). Time, cost, and scope are inter-related insofar as they compete with one another for limited resources and must be balanced to successfully complete a project. For example, if a project deadline is tight, a manager will need enough resources to deliver it on time. However, resource limitations might make an ambitious deadline unachievable. If both time and money are constrained, the scope of the project must be modified in order to be completed as scheduled and on budget.

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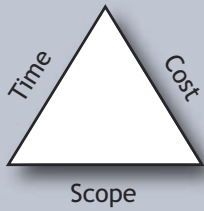


Figure 1.

To illustrate how triple constraints might work in a UVM context, consider a transmission project that must be completed in the coming calendar year for compliance with FAC-003. The planned scope is to clear the right-of-way (ROW) to a full wire-border zone prescription. That's fine if there is enough money

for the human and equipment resources needed to finish the job to full specifications by year end. If not, additional money needs to be applied to the project or funding also becomes limiting. If money presents a second constraint, the scope will need to be altered to meet the time objective. The point is that if limits are placed on one or more factors, an adjustment must be made in one or two of the others or the project will fail.

Work Breakdown Structure

Work breakdown structures are another important PM principle. A work breakdown structure is a prioritized outline of job components that must be completed for a successful project outcome (Baca, 2007). The work

breakdown structure serves as a plan framework, often constructed with PM software. The longest period a series of tasks requires from project beginning to end is the critical path (Kendrick, 2004).

Work plans document task beginning and end, assign personnel, designate responsibility, relate specifications, and itemize costs (Matheny & Clark, 2008). The highest level is the project overview and intermediate levels are waypoints toward completion. The final level is the work package that brings the project to a close. Work packages are often assigned to a single individual or team of individuals, like tree crews (Baca, 2007).

Dependencies

Work breakdown structures are subject to dependencies. Dependencies are the relationships that dictate when tasks begin and end. Baca identifies three types: mandatory, discretionary, and external.

A mandatory dependency is when one task cannot begin until another activity has ended. For example, some utilities may not allow a contractor to begin work on a project without written authorization. In this case, field work is mandatorily dependent on written authorization from the utility. ►

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Discretionary dependencies are managerial preferences intended to meet specific objectives. For example, a VM team might decide to complete distribution three-phase lines before they begin single-phase taps. In such a case, a discretionary dependency exists between single- and three-phase work.

An external dependency is a relationship between a task directed by the PM team and an action outside of their control. For example, VM work on federal lands in the U.S. requires written notice from governmental land managers before it can proceed. Since utilities cannot initiate work until permitted, federal authorization is an external dependency. This is also an example of a mandatory dependency.

Dependencies have relationships to one another relative to when they begin and end. Examples include finish-to-start, start-to-start, finish-to-finish, and start-to-finish. A finish-to-start dependency describes a relationship where a preceding task must be fully completed before

the successive task can begin. The discretionary dependency that requires three-phase distribution lines to be finished before crews begin work on single-phase lines is a finish-to-start relationship. In a start-to-start dependency, the successor cannot start until the predecessor has started. A start-to-start case might involve pre-inspectors; line-clearance work cannot start until pre-inspection starts. In a finish-to-finish dependency, a successor cannot finish until a predecessor has finished. For instance, some utilities distribute surveys to customers on whose property line clearance work was conducted. Survey cards cannot be returned until after work has been completed. The final relationship is a start-to-finish dependency, where the successor cannot finish until a predecessor starts. Start-to-finish dependencies are rare (Baca, 2007).

Gantt Charts

Gantt charts are horizontal bar graphs plotted along a timeline. It was developed by Henry Gantt in the early

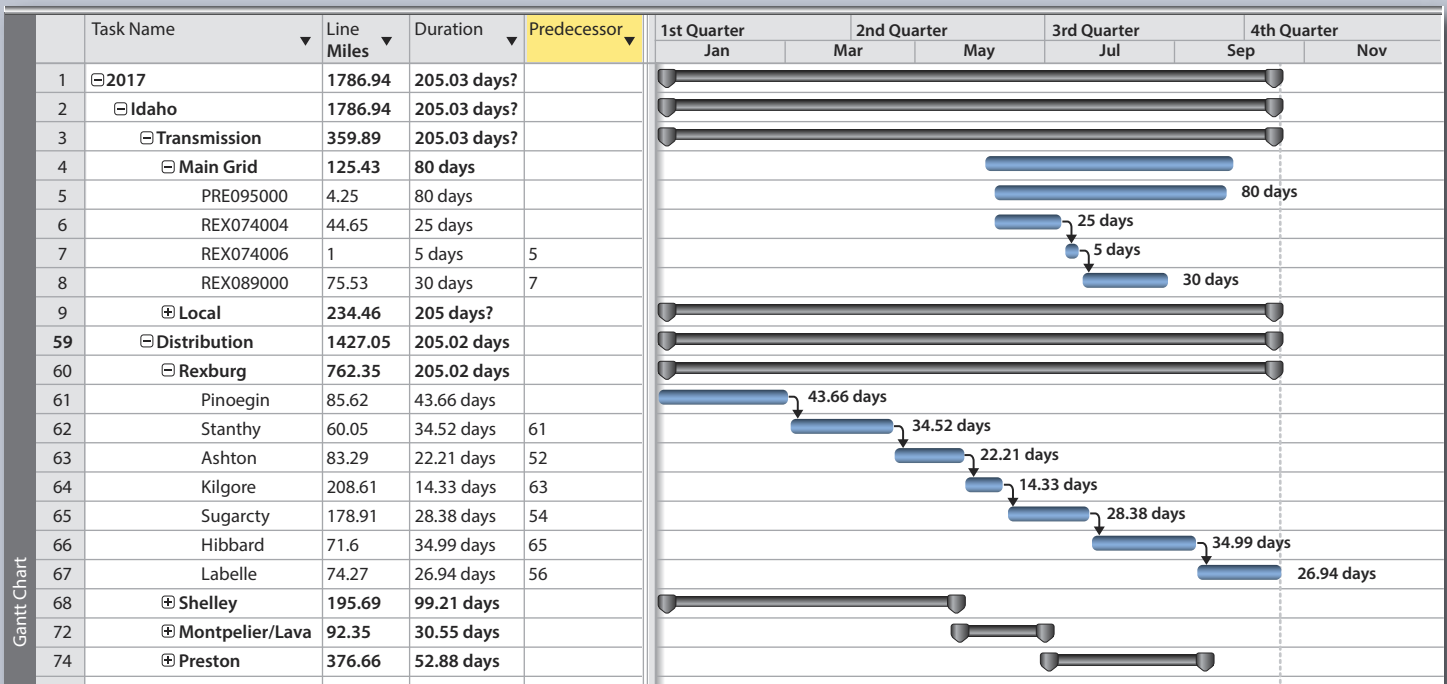
1900s. Gantt charts typically list activities or tasks associated with a project along the Y-axis and time along the X-axis (Figure 2). They are scheduling tools that provide a visual means of tracking a project, representing the desired starting date for every task involved in a project, and the estimated length of time each will take (Matheny & Clark, 2008).

Work Management Systems

Computerized work management systems integrate multiple layers of data into a geographic information system (GIS) platform. These are databases embedded in maps. Clicking on a point on a map enables access to records associated with that site, such as:

- Previous complaints or areas of concern
- A site of ongoing litigation
- Cultural sites
- “Cycle buster” trees
- Environmentally sensitive areas
- Historical lands
- Lines by type
- History: date last worked, production (e.g., man-hours a

Figure 2. Example of a Gantt chart



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GIS work flow systems can help managers coordinate events using data on conditions, workload inventories, ground and aerial patrol results, outages, satellite imagery, work history, property ownerships, refusal and concerned customer history, topography, environmental assessment reports, training records, surveys, testing results, and other pertinent information (Meehan, 2007). They can aid in report development, preventative maintenance

scheduling, and cost management, as well as tracking work history and service requests. Meehan also notes they can facilitate unit or cycle cost determination (Figure 3). Most PM software can plot Gantt charts, work breakdown structures, critical paths, dependencies, scopes (e.g., line miles or acres), start and stop dates, budgeted monetary resources, and other relevant factors. The software may be used for individual projects such as a line or grid or work within a specified length of time. The visual layout allows managers to view dependencies and anticipate constraints so they can be proactively addressed (Kendrick 2004).

The visual properties of GIS capability can be valuable decision-making tools. For example, work history at a location, or details on sensitive environmental or cultural sites at or near planned work, can be combined with scheduling capabilities to alert managers of anticipated problems and enable them to adjust plans accordingly. GIS can also note access locations and effectively deploy crews. Vegetation types and location can be mapped and highlighted if inside of action thresholds, so crews can be efficiently routed to where they are most needed (Meehan, 2007). LiDAR data can also be applied to this purpose. Among other applications, GIS can be used in community presentations to show the consequences of failing to clear trees from power lines



by establishing the relationship between outages and areas where property owners have been resistant to tree work.

In the field, GIS combined with GPS capability can increase efficiency by eliminating paper maps and leveraging the technology's data processing functions. Use of GIS can also increase efficiencies by diminishing the need to manually transfer data to reporting programs (Ross, 2011).

Summary

UVM is complex and expensive. PM provides a framework to deliver an efficient program. Ideally, that means on budget, on time, and to the desired quality. In reality, one or more of those matters are limiting, causing constraints. Other PM fundamentals work breakdown structures, dependencies, and Gantt charts. Work planning and management software can be an essential tool in applying PM principles. Readers should be aware that PM is a profession unto itself and entire volumes have been dedicated to the subject. Those interested are encouraged to consult the references provided below as a starting point to learn more on the topic.

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The Practical Application of Project Management Principles and Techniques for UVM



*By Stephen Tankersley,
President and CEO,
Clearpath*

Project management (PM) is defined by the Project Management Institute (PMI®) as “the application of knowledge, skills,

tools, and techniques to meet project objectives. PM is accomplished through application and integration of the PM processes of initiating, planning, executing, monitoring and controlling, and closing.” PMI’s Guide to the Project Management Body of Knowledge (PMBOK® Guide) states that managing a project includes:

- Identifying requirements
- Achieving clear and achievable objectives
- Balancing the competing demands for quality, scope, time, and cost
- Adapting the specifications, plans, and approaches to the different concerns and expectations of the various stakeholders

Utility vegetation management (UVM) benchmarks tell us that approximately 80 percent of utilities perform their work on a cyclic basis, typically between three to five years. However, the same benchmarks tell us 90 percent are not able to complete their established cycles. The 10 percent that do either use PM principles or are very lucky. And, those utilities that have a prescribed cycle—and meet that cycle—not only tend to have better reliability and safety results, they also have fewer issues getting and re-

taining funding and executive support for their UVM programs.

We will illustrate how employing PM principles and techniques can make the difference between success or not in the world of UVM.

I was introduced to PM in the early 1980s during a period of major power plant and transmission line construction in California. In four or five years, I was involved in many different projects—they were mostly construction related, and in the late 1980s, I managed an information technology (IT) project building a construction management program with PM functionality. With time, I learned, used, and even taught PM.

In the late 1990s, I accepted a position in VM, a far different world than where I had been, and took that previous PM experience with me.

To this day, I still remember the expressions of the VM leadership team when I announced we will be employing PM within the department, and promptly changed their titles from “Area Utility Arborist” to “Vegetation Program Managers” (VPMs). They were not interested in this adjustment. Some argued: “We are utility foresters. This is for construction. What are you doing?”

With an internal and contracted workforce of more than 2,000 people and at least 200 supervisors and managers, to say it was a struggle at the beginning is an understatement. However, the day of reckoning came some 18 months later when I hap-

pened to attend a tailboard meeting in the field and listened to a contract tree supervisor go around the table asking for statuses. I heard a foreman respond, “I’m working six crews on circuit ABC with 106 trees remaining and will be done on Wednesday. We will start circuit CDF on Thursday, forecasted with 798 trees and will need an additional crew to be done on schedule.” Each subsequent foreman did the same. Just 18 months earlier, they were only talking about work for the current day, or tomorrow at best.

All through the organization, they understood, and it soon became second nature. Effective PM is essential to achieving the desired results of any undertaking, whether it be building a house, developing a software program, constructing a nuclear power plant, or managing a UVM program.

When analyzing the most common reasons for failure of a project, it comes down to one or more or more the following:

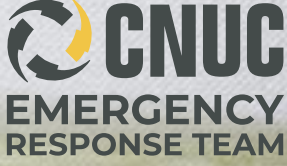
- Lack of a well-defined scope (what is the objective?)
- Lack of planning
- Lack of or ineffective use of resources (typically financially or personnel)
- Lack of scope discipline
- Poor controls (work quality, schedule/milestone attainment, cost, etc.)
- Poor execution

Effective PM provides a structured approach to help address these common pitfalls. In its most basic form,



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PM has four key elements: scope, schedule, budget, and execution.

Project Scope

- What is the goal or objective and how does the project support that goal?
- What work is needed to support the objective?
- What requirements and specifications are needed for the work to be accomplished?
- How will the work be performed?

Examples of what a UVM objective and scope might look like:

- Ensure the safe and reliable operation of the electric transmission and distribution system by minimizing tree and power line conflicts (*set metric goals, such as SAIFI, SAIDI, or outages per mile*).
- Perform work necessary to achieve your goal—such as a three-year VM cycle.
- Detailed specification of work to be performed, such as inspecting 1/3 of the electric system on an

annual basis, pruning or removing all trees that can grow in that system, and hazard trees that may fall in the power lines, etc.

- Additional detail: how the work will be performed: grid, circuits, scheduling methodology, practices, procedures, etc.

Plan and Schedule

- Break the work down into manageable, distinct, and quantifiable increments of work.
- Quantify each increment of work: miles, grids, trees, etc. Planned, forecast, and actual.

Plan: This is the workload that is planned and budgeted for the project. For example, when planning a circuit, the number of units (trees, brush, trims, removals, etc.) along with miles to be worked. Add up all circuits and this is the planned quantity of work divided by the total miles to be worked.

Forecast: This is a living variable

that represents adjustments to the workload as the project is being set up and worked. The forecast may rise or fall relative to the plan or it may remain constant. Circuit level forecasts relative to the plan are likely to have significant variability (+/-) but when rolled up, it takes much of the variability out.

Actual: This is the ongoing measure of work as it is completed and ultimately the final measure of work completed relative to the plan. Actual work performed - forecast work = work remaining. This is the most critical thing you need to know, as what is left is the only thing you can control.

- Determine the critical path, if any. If you are pre-planning or inspecting your system prior to the tree work, that would be considered a critical path and must be ahead of the tree work by an optimal amount.
- Schedule each increment of work (circuit/grid and any critical path) and distribute the workload across the duration of the project. ►

Budget

Although it is common in the UVM industry to assemble a plan based on budget allocations (or top down), the best application of PM is to develop your budget and resources based on the scope of work and the schedule to get it completed according to plan (bottom up).

- Determine resources needed to execute the plan based on the quantity of work to be performed.
- Determine resources available measured against what is needed.
- If they don't match, go back to step one and either secure additional resources or modify the scope.

Work Execution and Project Controls

Manage the Project Scope

- Managing the project scope is one of the biggest challenges of a project manager.
- Scope creep and scope deficiency are certain to cause project failure.

- Remember: every time you say "yes" to an increase in the scope, you are saying "no" to something else that was in your plan that you can no longer afford to do.
- Regular reviews, rigorous quality control, and a disciplined change management process are effective tools to manage scope.
- A project should include contingency in the budget to fund critical work that was not included in the approved scope document, but is essential to the successful completion of the project.

Manage the Schedule

- Note how much work is accomplished in comparison to what was planned. Learn from the difference.
- How much work remains is your forecast to completion. This is something for which you have control.
- Measure progress by the quantity of work orders completed.
- Measure what "to do" by quantity

remaining.

- Use history to determine trends and pace of work measured against what is left.
- Monitor trends and act early when needed.

Manage the Budget

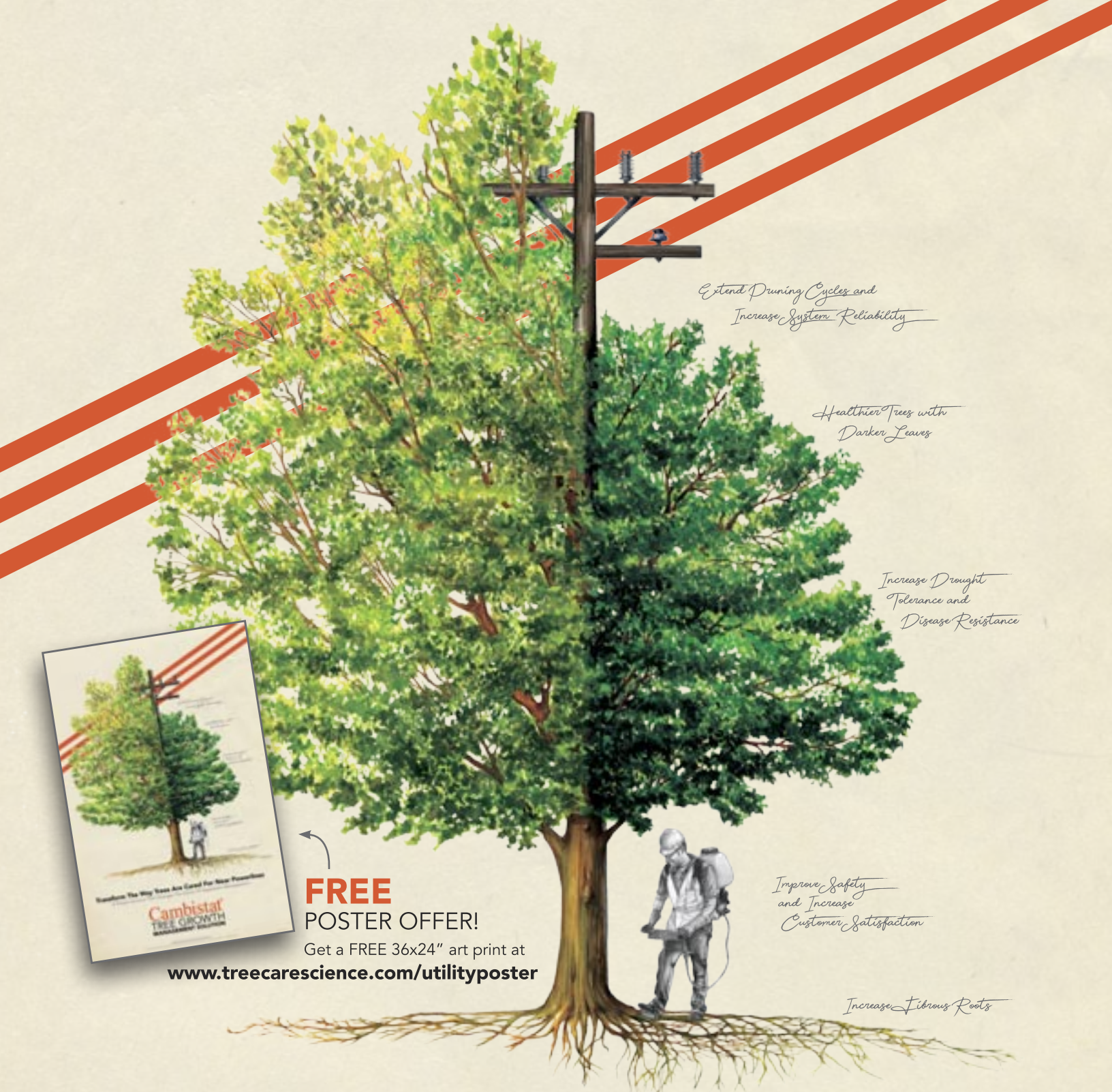
- How much work has been done and at what cost?
- How much work is left to do and at what cost?
- Can you meet the plan with the remaining budget? If not, you must adjust the budget or the scope.

The basic principles of PM can be applied almost anywhere in which you need to accomplish a critical objective. You can use complex PM software or simple spreadsheets, depending on the complexity of the project. If done correctly, these principles will greatly increase the probability of success where others may have failed.

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Tackling Timing: A Look into the Nature Clock

Dr. Anand Persad, PhD; BCE, Manager Arboriculture and Plant Sciences/Entomologist, The Davey Institute

With changing weather patterns and erratic climates, the old model of predicting the peak of blooms and pests based on calendar dates has become obsolete. In the face of this new challenge to predict these periods to best manage pests and optimize greenspace planning, Dr. Persad's Nature Clock, the product of years of research, has emerged as a solution to predict biological occurrences. The increase in efficiency and effectiveness provided by the Nature Clock could prove invaluable to capitalize on optimal times to treat and manage pests in the field or plan for bloom availability in plants.

The basic concept of the Nature Clock is to track Growth Degree Days (GDD) based on warmth and help determine phenology, or bloom cycles, and seasonality of natural occurrences. "When I started with Davey, we used treatment cards, which had previously worked well for decades," said Dr. Persad. "However, with the current erratic weather patterns, we needed something more relevant and dynamic."

The value of "warmth" is calculated by a simple formula using the maximum and minimum temperatures, as provided by weekly GDD data, localized by region, from the National Oceanic and Atmospheric Association (NOAA). Using this to determine when events will transpire has proved much more reliable than simply using calendar dates from previous years for prediction.

This increase in accuracy can prove vital for planning work dependent upon events such as flowers blooming and insects hatching. One of the many ways this could prove beneficial is in the creation of restorative right-of-way (ROW) plans for pollinator use. Pollinators need to have blooms and nectar resources available for sustenance, especially to meet critical requirements throughout the course of their life cycle. They also fare much better when there are resources to aid them in overwintering sites and the early portion of the seasons.

Being able to determine when certain species of plants are in bloom can help craft a planting strategy which aligns the different life cycles of insects with nectar and bloom availability. This can be implemented in a dynamic ROW restoration plan, which aligns the peak blooms of the species it chooses to include with the needs of pollinators.

Technology
on the
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The Davey Nature Clock is a patent-pending software Growing Degree Day (GDD) based clock which predicts biological activity—including bloom time and pest emergence—using local weather data from more than 400 locations across the U.S. to assist field operations with more precise timing of pest management applications.

This can help ultimately to bolster the population of pollinators, such as the threatened Monarch Butterfly and bees, which provide myriad benefits.

Besides predicting when a pest will hatch or emerge from dormancy, the Nature Clock breaks down when different parts of its life cycle occur. In particular, the prediction math model forecasts future pest activity, which determines when crews should be monitoring and when they should plan to treat for the pest in order to best manage it with increased application timing accuracy. The clock has a

built-in reference guide, which includes helpful information such as pictures of the pest and recommendations as to the most effective treatment for that species.

Currently, there are a few limitations to the use of the Nature Clock. One such impediment is that the "warmth" values are taken from local weather stations, and the distance between the site in question and the station from which the data was procured may create some variable results. The microclimate of an area has the potential to be variable; hence, accuracy relies on proximity of the tree or shrub in question to the weather station. However, technicians and arborists are encouraged to factor in corrections based on observations in their local geography. As sensor technology develops and we are able to have more localized weather, this will eventually lead to a much more accurate system with time. For now, there is still greater accuracy with the Nature Clock than other methods for determining phenology and insect emergence.

PHOTOS: GYPSY MOTH LARVA: KARLA SALP, WASHINGTON STATE DEPARTMENT OF AGRICULTURE, BUGWOOD.ORG; GYPSY MOTH ADULTS 2652080 - USDA APHIS PPQ, USDA APHIS PPQ, BUGWOOD.ORG; CHERRY BLOSSOMS: USDA PHOTO BY LANCE CHEUNG

Keeping Your Eyes on the Road

Opinion Editorial By Nathan Jones, Technology Consultant, Terra Spectrum Technologies

When I was a young man attending college, I would often find myself driving my old '89 Honda Accord down I-25 late at night, going to and from Fort Collins, Colorado. One particular evening, a youthful lack of discretion came over me, and I decided to briefly drive a stretch of the highway without any headlights on. Traveling at 85 miles per hour (MPH) through the pitch-black night illustrated to me just how vulnerable you can be if you aren't able (or willing) to monitor the surroundings. One bump in the road, one wandering deer, or one piece of roadside equipment is all it would have taken for disaster to strike. Luckily for everyone, my foolish stunt passed without incident.

Flash-forward to present day, things have only gotten more complicated in the business of dangerous driving. The blessing and curse of the smartphone has taught us that we don't need to be driving down the highway at night to be an incredible threat to those around us—merely casually glancing down while driving is enough to endanger lives. We rely on constant feedback from the world around us in order to function safely and effectively; ignoring it is, at best, foolish and, at worst, deadly. Managing a utility vegetation management (UVM) program can be a bit like driving that old Honda Accord down the highway at night—if you keep your eyes on the road and your lights on, you can navigate the twists and turns reliably; look down at your phone or drive with the lights turned off altogether and you could end up in the ditch or worse.

The UVM environment is extremely rich in data, with information constantly flowing in from utility personnel, contractors, and customers. Having possession of this massive amount of data is only half of the battle; the other half is interpreting

The UVM environment is extremely rich in data, with information constantly flowing in from utility personnel, contractors, and customers. Having possession of this massive amount of data is only half of the battle; the other half is interpreting it and putting it to good use.

it and putting it to good use. Similar to the driver who ignores the warning signs as they drive down the highway, a UVM program ignores data trends and analytics at their peril. *What* the numbers are is the easy part. It is fairly simple to acquire statistics regarding the number of trees pruned, amount of herbicide used, cost per tree, etc. The *why* of the numbers can be the more difficult (and more important) piece of the puzzle. *Why* does this particular feeder experience 35 percent more outages on average than the others? *Why* is a particular species of tree suddenly falling below eye level? *Why* has the inventory of 24- to 36-inch elms increased by at least 50 percent each cycle for the last three cycles? *Why* does the speed limit drop from 75 MPH to 45 MPH in this particular location? The speed limit drops because there is a sharp curve ahead that requires a slower speed to navigate safely. Warning signs are all around us, and a savvy vegetation manager will learn to read the signs and steer the program appropriately.

Every utility is different, and likewise, every UVM program is different. There certainly is no template for running a successful UVM program—that's where data analytics become useful. The beauty of harvesting the bounty of data available

in the field is that you can see precisely what is happening on *your* system and make real-time decisions based on the data that best suits *you*. A deep dive into your data can allow you to fine-tune your cycle lengths, track and adjust removal rates to focus on problem trees, monitor crew production based on a variety of metrics, accurately track herbicide usage, see if the budget is on track based on projections, and so much more. The raw data is all out there; all you have to do is reach out and grab it. Once you have it, a quality software system will make short work of crunching the numbers and present the acquired data in a meaningful and easy-to-interpret manner, so you can act quickly and intelligently move the program in the right direction.

Making the most informed decisions possible in any business can be the difference between success and failure, and the UVM sector is no different. With modern data collection methods and specialized analytical tools, collecting and analyzing field data has never been easier than it is today. However, acquiring and analyzing the data is just one piece of the puzzle. Once the data has been acquired, it's up to the VM team to take that analysis and apply the findings for the betterment of the system. Just like driving a car down the highway, a savvy vegetation manager must take the constant stream of incoming data, interpret it in a way that is most appropriate for their specific program, and steer the program in the safest possible direction.

Of course, hitting a few potholes is inevitable, but a good driver will take lessons learned in the past and apply them to future obstacles when they present themselves. And contrary to what the younger version of me would say, the "check engine" light is not there just for decoration.

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Protecting Critical Habitat Along Duke Energy's ROWs

The National Wild Turkey Federation's (NWTF) Energy for Wildlife program received a financial boost, thanks to a \$500,000 Duke Energy Foundation grant to conserve or enhance more than 6,000 acres of critical habitat across Indiana, the Carolinas, and Florida..

The project is designed to benefit imperiled pollinators and birds, as well as numerous other wildlife species. Conservation efforts are focused on establishing or enhancing habitat on public lands, such as state or national forests, and nearby areas where Duke Energy's transmission rights-of-way (ROW) split large areas of forested habitat. The enhanced habitat conditions will provide cover and a sustainable food source, while serving as a protective travel corridor for wildlife species that need it most.

"The NWTF has worked with Duke Energy to enhance habitat along numerous ROWs, but this partnership takes our efforts for wildlife and habitat improvement to an entirely new level," said Steve Barlow, director of energy partnerships, NWTF. "We are leveraging this funding and the dedication of our volunteers to directly benefit some of the most significant habitats across Duke Energy's coverage areas."

Funding is also supporting education efforts for Duke Energy customers—landowners and regional stakeholders—about the benefits of adopting conservation practices on their own properties. In addition, Duke Energy is offering in-kind support for the project, including coordinating in-house vegetation management (VM) professionals to help with the location and implementation of the projects.

"We're taking action now to ensure that our kids and grandkids can enjoy the benefits of natural habitat and wildlife that we now enjoy," said Jeff Racey, director of transmission vegetation, Duke Energy. "Beyond this donation, we are rolling up our sleeves and working with NWTF to conserve the natural habitat that wildlife and future generations will depend on."

Conservation practices, which include integrated VM (IVM), timber management practices, and targeted herbicide treatments, aim to provide enhanced feeding and nesting environments for wildlife species.



Out of the Fire

*Opinion Editorial by Dustin Lauf,
Regional Supervisor, CNUC*

California is a beautiful place to live. We Californians get to enjoy winding rivers, clear lakes, scenic mountains, and miles upon miles of oceanic views. However, living in California isn't always easy. In addition to winter, spring, summer, and fall, Californians also go through the most dreaded season of all—fire season. Fire season generally ranges from mid-May to late October. Historically, October is the worst month of the season. According to the Californian government, seven of the 10 most destructive California wildfires started in the month of October. Although most California wildfires occur within the normal range of months, recent weather pattern changes have made the fire season more erratic. The largest California wildfire in history, the Thomas Fire, began in December of 2017. With fires regularly ripping through our landscapes, vegetation programs have increased the work load for post-fire patrols to ensure that both the public and new infrastructures are better protected.

In the summer of 2018, we utility arborists faced the challenge of inspecting thousands of burnt trees along miles of transmission and distribution lines. We had to determine which trees needed to be dealt with immediately, which trees appeared to be dying but weren't a priority, and which trees will likely survive. We also had to work with returning property owners, law enforcement, the National

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From a management perspective, postfire inspections can be very stressful. Not only are we sending inspectors and qualified tree crew personnel in to inspect and remove hazardous trees in dangerous areas, but we're also asking them to do it while keeping safety and compassion for peoples' properties and losses in mind.

Safety is always our top priority. We cannot have a successful day if even one person is harmed while working. We require all employees to keep very accurate information about the number of trees they have deemed hazardous and on which ones they have worked. These numbers are recorded and submitted to supervisors during one of their many status calls throughout the day. We also work very closely with the utility crews that are working diligently to install new powerlines. Last fall, the post-fire patrol used circuit maps provided by the utility to mark the location of the trees needed to be worked on and noted any access issues or hazards in the area. At the end of each day, we highlighted our actions on the maps and then transferred it all onto a larger circuit map to track progress as a complete group. All relevant tree data (e.g., tree species, height, DBH, and trim type) was recorded on

paper, added to the maps, and then given to the tree crews just like a work request.

For most of us working in the utility vegetation management (UVM) industry, the most dangerous part of our job is the time-consuming driving we complete on a daily basis. However, for post-fire patrols, the real danger doesn't start until we begin our patrols. Last fall, we regularly encountered downed wires that were potentially still energized, witnessed massive trees fall around us after days of smoldering, and had to be very careful not to fall into large cavities left in the ground after root pockets had burned away.

Post-fire patrols are dangerous, but necessary. Qualified inspectors, tree trimmers, and utility personnel put in long hours day after day in order to achieve our number one goal of delivering safe and reliable power. During fire season, the post-fire patrols work extended hours for multiple weeks without days off and still maintain a heightened sense of situational awareness. If we had one misstep while working in the field, the consequence could be not going home. Regardless, we knew our job was important—we were willing to put ourselves in danger to help people whose lives were changed forever by the fires.

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Regional Reports include responses to the following survey questions regarding fundamental program management:

1. How do you manage your monthly program cycles?
2. How do you follow up your completed work on your contractors?
3. How do you make changes to your program if you note that your program is not on schedule?
4. How do you set your budgets?
5. What metrics are used to track contractor productivity?
6. What other line-of-business work colleague is critical to managing your program? How do you manage or maintain that relationship?
7. If you were to mentor someone moving to a new VM utility position, with what lines-of-business would you encourage them to quickly establish work relationships?

Eastern Region

By Sam Vaughan, Supervisor, Electric Distribution Forestry, Dominion Energy Response By D. Scott Detar, Distribution Forestry Coordinator, Dominion Energy

1. For Dominion Energy’s (DE) distribution system, each circuit is set up on a recommended cycle for vegetation management (VM). The circuits scheduled for any given year are managed by Forestry Coordinators who consult with individuals in operations and planning to prioritize the order of work. To align with funding, monthly targets are established to arrive at leveled mileage and spending goals.

2. As work progresses through a circuit, suppliers submit completed miles for payment to DE. Utilizing an internally-developed inspection tool app, DE’s Forestry Coordinators denote completed spans as well as skips and discrepancies. The inspection tool calculates completed span mileage and submits that information to an online payment system, which marries up the mileage trimmed with the bid mileage price to generate an invoice. Utilizing the inspection tool, Forestry Coordinators can also generate skip and discrepancy lists, which are forwarded to suppliers for correction. Payment

for spans associated with skips and discrepancies is withheld until the work is corrected and resubmitted to the Forestry Coordinator to re-inspect and sign off on that work. Invoices are generated once per month for all spans that were completed since the previous invoice date.

3. Daily or weekly communication between DE Forestry Coordinators and supplier GFs is paramount to relaying concerns. Forestry Coordinators often meet crews in the field at work sites or prior to the work day at assembly points to emphasize safety, proper pruning, work methods, and job completion. Any questions crew members may have are encouraged. Additionally, periodic progress meetings are conducted by DE Forestry leadership and attended by crew leadership, middle management, and upper management on at least a semi-annual basis. Successes and concerns are noted and expressed openly, serving to reinforce superior results or to head off and correct issues before they become insurmountable obstacles. Following identification of needed corrections, adjustments can be made in manning by bringing in additional resources and working overtime if behind, or by shifting resources off-system if too far ahead.

4. DE Distribution Forestry bids out multi-year contracts. Based on scheduled work and circuit pricing, budget needs are communicated to DE executive leadership who analyze corporate needs and relay funding levels. Budgets are allocated according to historical spending as well as through analyzation of projected costs of the work that is scheduled for any given district.

5. While contract language is in place to hold suppliers accountable for ensuring work is completed as specified and as scheduled, it also exists to reward suppliers for superior performance. Tracked metrics include mileage goals, vendor-caused outages, OSHA-recordable incident rates, customer claims, executive-level complaints, and observations by foresters. Recognizing that vendors covering many districts may not compare favorably to vendors covering very few districts, metrics are leveled and based per customer, man-hours worked, number of miles worked, etc., depending on the metric. Vendor metrics are tracked, compared with other vendors, and ranked.

6. Relationships have been established with several departments within DE, such that certain individuals in those departments are assigned the responsibility of assisting Distribution Forestry and act essentially as “account managers.” Those include, but are not limited to: Information Technology (IT), Supply, Human Resources, Accounting, and Accounts Payable. What we have found through the years is that nothing grinds us to a halt faster than confusion in the IT department. Because our inspection app and payment processes were developed in-house, there is a great deal of buy-in from our IT department to ensure those systems work properly. Frequent communication and inclusion between Distribution Forestry and other departments has fostered wonderful relationships with dedicated individuals who will go the extra mile to help us out.

7. Each forester is embedded

across our system footprint in local offices. The quickest way to guarantee success is by developing relationships with local operations and construction departments. Day-to-day emergencies that arise can normally be quelled with minimum disruptive effort. Our part in that effort should be accomplished quickly, professionally, and safely. Our customers expect and deserve our best response. If we deliver on that expectation, then it virtually always benefits us in the end.

Midwest Region

By J. M. Sparkman, Manager of Consulting Services, ECI; Response By Larry Axlen, VM Manager, We Energies

Sparkman's Comments: While the procurement of tree crew resources remains one of the biggest challenges

facing electric utilities today, justifying the need for additional resources and associated budget increases is equally challenging. To justify the need for additional resources, or to justify the need to keep existing resources, it is imperative that the utility show due diligence in the efficient and effective use of its current resources and budgets. As such, the utility must demonstrate it can effectively manage and complete its monthly and annual maintenance targets and goals. In this issue, we are asking Larry Axlen of We Energies, how utilities manage their monthly goals and hold their contractors accountable to meet these goals.



J. M. Sparkman

1. Cycles are managed through monthly reviews of completed man-hours and miles with each contractor general foreman. This consists of a review of the actual man-hours performed against the contractor estimated man-hours for each circuit worked. The hours are also compared against the historical three-year trend for each circuit.

2. All completed maintenance work is audited for quality and completeness. Deficiencies are returned to the contractor to be rectified.

3. Capital and reliability requests are adjusted (pushed up or pulled in) to meet targets. These programs are adaptive and reactive in nature and are constantly adjusted. The contractor is held accountable to meet monthly targets; however, there are currently no liquidated damages for missing targets.

4. Budgets are top-down. The

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VM department is given an annual budget to perform work and allocates the budget to maximize program goals to meet cost, reliability, and miles objectives.

5. Our productivity metrics include cost per mile, actual vs. estimated man-hours, and three-year man-hour trend by circuit.

6. Reliability and the Systems Improvement groups are critical in helping VM achieve annual objectives. Meetings with these two groups occur monthly or more often if needed.

7. In addition to the Reliability Group and Systems Improvement Group, close working relationships with designers, line crews, and operations managers are essential.

Southwest Region

By Dylan Evans, Vegetation Supervisor, Southern Utah; Response By Lorelei Phillips, Vegetation Supervisor, Pacific Power Covering Southern Oregon and Northern California

1. We work on a four-year cycle with a two-year interim to identify fast-growing and high risk trees. We set yearly cycle goals and monitor them weekly and monthly to ensure we are on track to deliver on our planned goals. Our work is scheduled based on many factors such as last work dates, weather, seasonal access, fire season, etc.

2. We hire a third party auditor to complete a 100 percent post-inspection on most of our work. We also

complete periodic crew-based audits for quality control and for contractor coaching opportunities. In high fire threat areas, we conduct internal audits to increase quality control measures.

3. With the dynamic nature of vegetation management (VM), setting a hard line yearly cycle is a difficult task. We need be goal oriented while maintaining flexibility to adjust our scheduled plan. We have to ensure that we stay in compliance with state regulations and



Dylan Evans

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Respondent Lorelei Phillips, Vegetation Supervisor, Pacific Power and local line patrolman, Scott Reed.

requirements and often shift resources between districts and add resources as needed to meet our schedule goals.

4. Yearly budgets are allocated by work type, including transmission, distribution, cycle, interim, pole clearing, herbicide, and tree growth regulator work. The budget is based on historical work, inspections, cycle objectives, removal estimates, specification changes, etc. Thorough evaluations are completed on transmission each year to determine which segments should be prioritized for work with proper budget allocated to areas with high density vegetation and high-risk trees.

5. The main metrics we consider when evaluating productivity in the field are cost per mile, cost per tree, and man-hour per mile, and man hour per tree.

6. I consult with old coworkers and colleagues that work at different utilities or companies to determine strategies and industry best management practices (BMPs) to handle evolving changes in the industry. Attending UAA or ISA conferences are also important for networking and learning from others in the industry. Internally, I work closely with our line patrolman, general foreman, community relations managers, and operations managers to ensure there is an open line of communication on VM practices and policies, and to share changes in regulation, requirements, etc.

7. I would encourage them to build a relationship with our regional business and community managers, district operations managers, general foreman overseeing distribution line crews, line patrolman, external public land management, and state agencies, as well as city and county managers.

UAA needs your help!

Every two months, UAA Regional Representatives can provide a report for the *Utility Arborist Newsline*. Let them know what is going on in your company or in your region.

2018-2019 Regional Representatives

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